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(54) **METHODS OF CONTROLLING  
 COMMUNICATION PARAMETERS OF  
 WIRELESS SYSTEMS**

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**455/69; 455/101; 455/102; 455/272**

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**272**

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(57) **ABSTRACT**

The present invention provides a method for controlling a communication parameter in a channel through which data is transmitted between a transmit unit with M transmit antennas and a receive unit with N receive antennas by selecting from among proposed mapping schemes an applied mapping scheme according to which the data is converted into symbols and assigned to transmit signals  $TS_p$ ,  $p=1 \dots M$ , which are transmitted from the M transmit antennas. The selection of the mapping scheme is based on a metric; in one embodiment the metric is a minimum Euclidean distance  $d_{min,rx}$  of the symbols when received, in another embodiment the metric is a probability of error  $P(e)$  in the symbol when received. The method can be employed in communication systems using multi-antenna transmit and receive units of various types including wireless systems, e.g., cellular communication systems, using multiple access techniques such as TDMA, FDMA, CDMA and OFDMA.

**55 Claims, 6 Drawing Sheets**

